FORM PTO-1390
REV. 5-93

US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEYS DOCKET NUMBER
P00,0345

U.S.APPLICATION NO. (if known, see 37 CFR 1.5)
09/509062

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE98/02778	**18 September 1998**	19 September 1997

TITLE OF INVENTION
A COMMUNICATIONS DEVICE FOR TRANSMITTING MESSAGE CELLS

APPLICANT(S) FOR DO/EO/US
Jorg Kopp et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **Executed declaration**

10 ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, Prior Art, Search Report)

12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. (See Attached Envelope)

13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☒ Other items or information:
    a. ☒ Submission of Drawings - FIGS. 1-3 on two sheets
    b. ☒ Express Mail EL470808798US dated 3-20-2000

422 Rec'd PCT/PTO 20 MAR 2000

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/509062	PCT/DE98/02778	P00,0345

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):		
Search Report has been prepared by the EPO or JPO $840.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) . . $720.00		
No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) $790.00		
Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $1070.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) . . . . . $ 98.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	1 - 20 =	0	X $ 18.00	$	
Independent Claims	1 -3 =		X $ 78.00	$	
Multiple Dependent Claims			$260.00 +	$	
TOTAL OF ABOVE CALCULATIONS =				$	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)				$	
SUBTOTAL =				$	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$ 840.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +					
TOTAL FEES ENCLOSED =				$ 840.00	
				Amount to be refunded	$
				charged	$

a. ☒ A check in the amount of $ 840.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2290. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

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NAME

39,056
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BOX PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

PRELIMINARY AMENDMENT

APPLICANTS: Jörg Köpp et al. DOCKET NO: P00,0345

SERIAL NO: GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE98/02778

INTERNATIONAL FILING DATE: 18 September 1998

INVENTION: **A COMMUNICATIONS DEVICE FOR TRANSMITTING MESSAGE SIGNALS**

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before entry into the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371 as follows:

In The Specification:

On page 1, cancel lines 1-4 and substitute therefor:

--S P E C I F I C A T I O N

TITLE

A COMMUNICATIONS DEVICE FOR TRANSMITTING MESSAGE SIGNALS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a communications device for transmitting message signals wherein arbitrary redundancy structures may be created with relatively little outlay in terms of control technology and circuitry.

Description of the Prior Art.--

On page 1, line 7, cancel "bee" and substitute therefor --be--.

On page 1, line 11, cancel the "," after "parallel".

On page 1, line 12, cancel "But" and substitute therefor --However,--.

On page 1, line 16, cancel ", while a" and substitute therefor --. A--.

On

On page 1, line 19, cancel "plurality" and substitute therefor --number--.

On page 1, line 21, cancel "then".

On page 1, line 24, cancel ", which" and substitute therefor --. Such--.

On page 1, line 26, cancel "But it" and substitute therefor --It--.

On page 1, line 26, cancel "that" and substitute therefor --, however--.

On page 1, line 27, cancel the "," after "fails".

On page 1, line 27, insert a --,-- after "or".

On page 1, line 28, cancel the ",".

On amended page 2, line 3, cancel the ",".

On amended page 2, line 3, cancel "be able to".

On amended page 2, line 4, cancel "realize" and substitute therefor --arrive at--.

On amended page 2, line 4, cancel "But" and substitute therefor --However, --.

On amended page 2, line 5, cancel "realization" and substitute therefor --creation--.

On amended page 2, line 8, cancel "The".

On amended page 2, line 9, cancel "trnasmitting" and substitute therefor --transmitting--.

On amended page 2, line 9, cancel "The".

On amended page 2, line 13, cancel "the" before "object" and substitute therefor --an--.

On amended page 2, line 13, insert --present-- before "invention".

On amended page 2, line 13, insert --, therefore,-- after "invention".

On amended page 2, line 13, cancel "demonstrate how to".

On amended page 2, lines 14-15, cancel "according to the preamble of patent claim".

On amended page 2, line 15, cancel "realized" and substitute therefor --created--.

On amended page 2, cancel lines 18-19 and substitute the following centered heading therefor:

--**SUMMARY OF THE INVENTION**--.

On amended page 2, line 21, cancel "The" and substitute therefor --Accordingly, the present--.

On amended page 2, line 22, cancel "realized" and substitute therefor --created--.

On amended page 2, cancel lines 25-29 and substitute the following paragraphs therefor:

--In an embodiment of the present invention, therefore, a communication device is provided for transmitting message cells which each have routing information at their disposal, wherein the communication device includes: a coupling arrangement; a plurality of line assemblies allocated to the coupling arrangement which are respectively connected to at least one transmission line; a changeover logic arrangement in the coupling arrangement which is connected, at least in an outgoing direction of transmission, in series to the plurality of line assemblies; and a storage arrangement available to the changeover logic arrangement which has a plurality of register cells corresponding to a number of possible different items of the routing information, wherein the plurality of register cells can be

individually controlled on the basis of the individual items of the routing information for the purpose of delivering selection information which is respectively stored in the plurality of register cells, wherein the routing of the message cells to the plurality of line assemblies is controlled in accordance with the selection information made available by the register cells rather than the routing information, and wherein the selection information stored in the register cells can be individually modified.

Additional features and advantages of the present invention, however, will be described in, and will be apparent from, the following Detailed Description of the Preferred Embodiments and the Drawings.--

On amended page 2a, before line 2, insert the following centered heading:

--**DESCRIPTION OF THE DRAWINGS**--.

On amended page 2a, line 2, insert --shows a schematic-- after "Figure 1".

On amended page 2a, line 2, cancel "schematic".

On amended page 2a, line 3, insert --teachings of the present-- before "invention".

On amended page 2a, line 3, cancel the "," and substitute therefor a --;;-.

On amended page 2a, line 4, insert --shows a schematic-- after "Figure 2".

On amended page 2a, line 4, cancel "schematic".

On amended page 2a, lines 4-5, cancel "that is detailed below," and substitute therefor --of the present invention;--.

On page 3, line 1, insert --shows-- after "Figure 3".

On page 3, before line 4, insert the following centered heading therefor:

--**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**--.

On page 3, line 4, cancel "a matter of".

On page 3, line 5, insert --the-- before "asynchronous".

On page 3, line 12, cancel "and potentially" and substitute therefor --contains--.

On page 3, line 14, insert --also contains-- after "and".

On page 3, line 14, cancel ", as well".

On page 3, line 16, cancel "comprises" and substitute therefor --includes--..

On page 3, line 19, cancel "comprises" and substitute therefor --includes--.

On page 3, line 22, cancel "a matter of".

On page 3, line 25, cancel "said" and substitute therefor --the--.

On page 3, line 25, cancel "of" after "and".

On page 3, line 26, cancel "mater" and substitute therefor --matter--.

On page 4, line 1, cancel "plurality" and substitute therefor --number--.

On page 4, include the paragraph which begins on line 10 in the paragraph which ends on line 8.

On page 4, line 10, cancel "plurality" and substitute therefor --number--.

On page 4, line 10, cancel "can".

On page 4, line 10, insert --can-- after "also".

On page 4, line 14, cancel "comprises" and substitute therefor --includes--.

On page 4, line 15, cancel ", which" and substitute therefor --. Such--.

On page 4, line 22, cancel the ",".

On page 4, line 26, cancel "control means" and substitute therefor --controls--.

On page 5, line 1, cancel the "," and substitute therefor --. This is done--.

On page 5, line 7, cancel "this".

On page 5, line 7, insert --2-- after "Figure" and before "and".

On page 5, line 10, cancel "comprises" and substitute therefor --includes--.

On page 5, line 10, cancel the "," after "ZP".

On page 5, line 12, cancel "are".

On page 5, line 12, insert --are-- after "each".

On page 5, line 16, cancel ", by means of which" and substitute therefor --. Via such address pointers,--.

On page 6, line 4, cancel "above described" and substitute therefor --above-described--.

On page 6, line 4, cancel "is" and substitute therefor --will now be--.

On page 6, line 5, cancel "below".

On page 6, include the paragraph which begins on line 7 in the paragraph which ends on line 5.

On page 6, line 8, cancel ", by means of" and substitute therefor --via--.

On page 6, include the paragraph which begins on line 25 in the paragraph which ends on line 23.

On page 7, include the paragraph which begins on line 1 in the paragraph which ends on line 29 of page 6.

On page 7, line 2, cancel "said" and substitute therefor --the--.

On page 7, line 3, cancel the ",".

On page 7, line 3, cancel "aforesaid" and substitute therefor --referenced--.

On page 7, line 6, cancel "the" after "in".

On page 7, line 6, insert --now-- after "having".

On page 7, line 7, cancel "hereby".

On page 7, line 8, cancel "realized" and substitute therefor --created--.

On page 7, include the paragraph which begins on line 11 in the paragraph which ends on line 9.

On page 7, include the paragraph which begins on line 27 in the paragraph which ends on line 25.

On page 7, line 27, cancel "- for instance,".

On page 7, line 27, cancel the "-" after "adjacent".

On page 7, line 28, insert --, for example,-- after "positions".

On page 8, line 1, cancel "said" and substitute therefor --the--.

On page 8, line 6, cancel "realization" and substitute therefor --embodiments--.

On page 8, line 8, cancel "can".

On page 8, line 8, insert --can-- after "also".

On page 8, line 8, cancel "realized" and substitute therefor --effected--.

On page 8, line 8, cancel "are" and substitute therefor --is--.

On page 8, line 14, cancel ", among other things".

On page 8, line 16, cancel "a matter of" and substitute therefor --either--.

On page 8, line 17, cancel the "," after "payload cell".

On page 8, line 17, insert a --,-- after "or" and before "respectively".

On page 8, lines 17-18, cancel "it is a matter of".

On page 8, line 23, cancel the "," after "cells".

On page 8, line 23, insert a --,-- after "or".

On page 8, after line 29 insert the following paragraph:

--Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes

may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.--

On page 10, (last page) cancel lines 1-3 and substitute the following centered heading therefor:

--**ABSTRACT OF THE DISCLOSURE**--.

On page 10, line 5, cancel "Communication" and substitute therefor --A communication--.

On page 10, line 5, cancel "(KE)".

On page 10, line 6, cancel "(ASN)".

On page 10, line 7, cancel "(LIC A0...LIC A15)".

On page 10, line 7, cancel the ";" and substitute therefor a --,--.

On page 10, line 7, cancel "whereby" and substitute therefor --wherein--.

On page 10, line 8, cancel "(LPS)".

On page 10, line 8, cancel "(ASN)".

On page 10, line 9, cancel the "." and substitute therefor --, such that,--.

On page 10, line 10, cancel "Under" and substitute therefor --under--.

On page 12, cancel line 13.

In the Claims:

On page 9, cancel line 1 and substitute the following left-hand justified heading therefor:

--**I Claim As My Invention**--.

Please cancel claim 1, without prejudice, and substitute the following claim therefor:

2. A communication device for transmitting message cells which each have routing information at their disposal, the communication device comprising:

a coupling arrangement;

a plurality of line assemblies allocated to the coupling arrangement which are respectively connected to at least one transmission line;

a changeover logic arrangement in the coupling arrangement which is connected, at least in an outgoing direction of transmission, in series to the plurality of line assemblies; and

a storage arrangement which is available to the changeover logic arrangement, the storage arrangement including a plurality of register cells which correspond to a number of possible different items of the routing information and which can be individually controlled on the basis of the individual items of the routing information for delivering selection information which is respectively stored in the plurality of register cells, wherein the routing of message cells to the plurality of line assemblies is controlled in accordance with the selection information made available by the plurality of register cells instead of the routing information, and wherein the selection information stored in the plurality of register cells can be individually modified.

REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification in order to conform the specification to the requirements of the United States Patent practice. No new matter is added thereby. Original claim 1 has been canceled in favor of new claim 2. However, claim 2 has been presented solely because the revisions by bracketing and underlining which would have been necessary in claim 1 in order to conform that claim to the requirements of United States Patent practice would have been too extensive, and thus would have been too burdensome. The cancellation of claim 1 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1.

Early consideration on the merits is respectfully requested.

Respectfully submitted,

(Reg.No. 39,056)

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COMMUNICATION DEVICE FOR TRANSMITTING MESSAGE SIGNALS

The invention relates to a communication device according to the preamble of patent claim 1.

Depending on the fault tolerance required of a communication device, different redundancy structures can bee **[sic]** provided for the peripheral line assemblies belonging thereto. Examples of this are the "1+1", "1:1", and "1:N" types of line assembly redundancy, as is described in "IEEE Journal on Selected Areas in Communications" (Vol. 15, N. 5, June 1997, pp. 795-806). In a "1+1" redundancy structure, two line assemblies are operated in parallel, in order to transmit message signal currents over them redundantly. But only one of these redundant message signal currents is considered for further processing.

In a "1+1" line assembly redundancy, only one of two line assemblies is used as the active line assembly, while a changeover onto the other line assembly, which serves as a back-up assembly, occurs only in case of a failure of the active line assembly.

Finally, in a "1:N" line assembly redundancy, in addition to a plurality N of line assemblies, a single backup line assembly is provided. When a failure occurs on one of the N line assemblies, the backup line assembly is then used instead.

In a "1:N" line assembly redundancy, a selector arrangement is typically connected between the line assemblies and external transmission lines, which arrangement can distribute individual transmission lines to the N lines assemblies and to the backup line assembly. But it must be noted that, when a selector arrangement such as this fails, or respectively, in a resulting replacement of this selector arrangement, all the transmission lines that are connected to it are interrupted, along with the connections running via these lines.

Beyond this, it is mentioned in the cited document that a transfer logic arrangement (LPS: Line Protection Switch) is connected on the output side of the communication device between the coupling field and the line assemblies, in order to be able to selectively realize the abovementioned redundancy structures. But more detailed information about the mode of functioning and the realization of this transfer logic arrangement is not given.

The US patent US 5,331,631 teaches a device with redundancy structure for trnasmitting message cells. The US patent 5,473,598 likewise teaches a redundancy structure for telecommunication systems. In both references, modifications are made to the routing information in case of a backup changeover.

It is the object of the invention to demonstrate how to construct the transfer logic arrangement that belongs to a communication device according to the preamble of patent claim 1 such that arbitrary redundancy structures can be realized with a low outlay in terms of control technology and circuitry.

This object is inventively achieved in a communication device according to the patent claim 1 by the wiring features cited in this claim.

The invention imparts the advantage that redundancy structures can be universally realized on the basis of the development of the transfer logic arrangement, without having to access redundancy-specific elements.

Advantageous developments of the invention derive from the subclaims.

The present invention is detailed below with the aid of drawings. These drawings illustrate only those elements which are necessary in order to gain an understanding the present invention.

Figure 1 sectional diagram of the schematic structure of a communication device according to the invention,

Figure 2 sectional diagram of the schematic structure of a coupling element that is detailed below, and

Figure 3 the schematic structure of a control device that is provided in the coupling element illustrated in Figure 2.

The communication device KE illustrated in Figure 1 is a matter of ATM communications equipment that functions in accordance with asynchronous transfer mode, enabling the transmission of message signals in the form of message cells in the course of virtual connections. Since the ATM principle and the general structure of message cells have long been known, these are not detailed here. It is merely noted here that the message cells appertaining to a virtual connection have an information part ("user part") and a cell header ("header") at their disposal, respectively. Among other things, a cell header like this contains what is known as a virtual channel number VCI, which references the respective virtual connection, and potentially what is known as a virtual path number VPI, a routing address that applies to the respective virtual connection, and what is known as housekeeping information, as well.

The communication device KE comprises a central coupling field ASN, which has at its disposal a central coupling arrangement ASN-C (ASN Core) with an appertaining coupling arrangement control ASN-CC, and at least one ATM multiplexer AMX that is connected to the coupling arrangement. This ATM multiplexer comprises a separate control, referenced AMX-C.

The communication device KE can be a matter of what is known as a cross connect for setting up virtual permanent connections, or a switching node for setting up virtual dial connections. In either case, the set-up of the connections is accomplished with the aid of said coupling arrangement control ASN-CC and of the control AMX-C. However, since this process of setting up virtual connections is not subject mater of the present invention, it is not discussed in greater detail here.

In the present exemplifying embodiment, a plurality of line assemblies are connected to the central coupling arrangement ASN via the ATM multiplexer AMX, via bidirectional electrical connections, for example. As illustrated im Figure 1, the ATM multiplexer can be designed for connecting 16 line assemblies, which are referenced LIC A0 to LIC A15. These line assemblies are provided for connecting at least one peripheral transmission line, respectively. The transmission lines, which may be designed for a bidirectional transmission of message signals, are referenced A1 to A15, according to their allocation to the line assemblies.

Incidentally, it should be noted that a plurality of ATM multiplexers AMX can also be connected to the central coupling arrangement ASN-C, depending on the required size of the communication device KE.

The ATM multiplexer AMX illustrated in Figure 1 comprises at least one separate coupling element SE for each direction of the transmission, which elements have a structure 16/16 in the present exemplifying embodiment; that is, they have 16 inputs and 16 outputs at their disposal. These coupling elements are controlled by the control AMX-C of the ATM multiplexer AMX. Among other things, the control consists in the specifying of a particular connection path via the respective coupling element in the course of the set-up of virtual connections. As previously mentioned, for such an established connection path, a specific routing address is contained in the cell header of the individual message cells, in order to make it possible to route the respective message cell via the relevant coupling element SE on the correct connection according to the specifications of this routing address.

As is described in detail below, control means are provided at least in the respective coupling element that is provided in the outgoing direction of transmission (that is, from the ATM multiplexer AMX to the line assemblies LIC A0 to LIC A15), so that, when one of the line assemblies fails, a backup path via the respective coupling

element is selected according to a specific redundancy structure, without it being necessary to change the routing address that is contained in the message cells that are to be transmitted via the backup path.

Figure 2 is a sectional illustration of the schematic structure of a coupling element SE for the outgoing direction of transmission. The backup switching principle just described is detailed with the aid of this Figure and Figure 3.

According to Figure 2, the illustrated coupling element SE, and every other coupling element, comprises a central cell memory ZP, in which the message cells that are to be routed via the line assemblies LIC A0 to LIC A15 are temporarily stored. Beyond this, the line assemblies LIC A0 to LIC A15 are each assigned an individual logical queue, these being referenced Q0 to Q15 according to their allocation to the individual line assemblies. These logical queues can be controlled individually according to the routing addresses contained in the message cells, and they serve for the temporary storage of address pointers, by means of which it is respectively indicated where in the cell memory ZP the message cells that are to be routed via the allocated line assembly are respectively stored. These address pointers are made available by the cell buffer ZP.

The logical queues Q0 to Q15 are processed – for instance, by a scanner (which is not illustrated) – cyclically in succession in a definite order, whereby one address pointer is extracted from each of the queues per cycle. Within the respective queue, the entered address pointers are read out in accordance with the FIFO principle. The address pointers that are loaded by the cell memory ZP are entered into the queues in question with the aid of a queue control QC. For this purpose, with each arrival of a message cell, this control is supplied at least with the part of the appertaining cell header in which the abovementioned routing address RA (Figure 2) is contained.

With the aid of this header, the queue into which the address pointer just loaded is to be entered is determined.

The above described controlling of the logical queues by the queue control QC is discussed below in detail with the aid of Figure 3.

The central part of the queue control QC is formed by a transfer logic arrangement LPS, by means of which one or more arbitrary queues of the queues Q0 to Q15, and thus one or more line assemblies LIC A0 to LIC A15, can be randomly allocated to each routing address RA. For this purpose, a register is kept in the transfer logic arrangement LPS for every routing address possibly contained in the message cells. In each of these registers, a separate bit position is reserved for each of the queues Q0 to Q15; that is, in the given example, there are 16 bit positions provided per register. The queue into which the address pointer that has been detected for a message cell is to be entered during the storing of this cell is indicated by a specified logic level, for instance "1", in one or more bit positions of a register. By contrast, a logic level "0" signifies that the allocated queue is blocked.

The individual registers can be individually controlled at least according to the abovementioned routing addresses RA, which are contained in the respective message cells. The controlling is accomplished with the aid of a control logic arrangement (which is referenced QA in Figure 3), to which the routing address that is contained in the appertaining cell header is delivered with each arrival of a message cell.

Furthermore, the register contents of the transfer logic arrangement LPS are preloaded jointly by the control unit AMX-C illustrated in Figure 1 (which process is not illustrated) when the communication device KE is initialized (Figure 1), or they are modified individually if necessary; that is, in a backup switching process as described above, for example.

It is illustrated again in Figure 3 that the individual queues Q0 to Q15 can be controlled individually by the transfer logic arrangement LPS in accordance with said register contents, in order to pick up the aforesaid address pointers for message cells that are stored in the cell buffer ZP (Figure 2).

The basic method of functioning of the devices illustrated in the Figures 1 to 3 having been hereby described, it is now explained how the abovementioned various redundancy structures can be realized with the aid of the cited register contents of the conversion arrangement LPS.

In a system without assembly redundancy, a system with a "1:1" assembly redundancy, or a system with a "1:N" assembly redundancy, the queue (Q0 to Q15) that is to be used for picking up an address pointer currently being made available, and thus ultimately the line assembly LIC A0 to LIC A15 via which the message cell that is allocated to the relevant address pointer is to be routed, is respectively indicated in the registers of the changeover logic arrangement LPS by a logical "1" at one of the bit positions only. The other bit positions of the individual registers are set to the logic level "0".

When it is necessary to perform a backup changeover of a faulty line assembly (LIC A0 to LIC A15), which assembly is identified by a specific routing address, it is merely necessary to provide the previously marked bit position in the register, which is allocated to this routing address, of the changeover arrangement LPS with a logic level "0", and to mark a bit position that pertains to the backup switching process with a logic level "1" instead.

When a "1+1" assembly redundancy is required, two – for instance, adjacent – bit positions in the registers of the changeover logic arrangement LPS are set to the logic level "1", respectively, in order to thereby mark the queues that are allocated to these

two bit positions as activated. This means that, with said storing of a message cell in the cell memory ZP (Figure 2), the address pointer that is allocated to the message cell being stored is simultaneously entered into both of the queues that are designated active.

In addition to the realization just described of different redundancy structures with the aid of specific register contents of the changeover logic arrangement LPS, a broadcasting can also be realized in that a logic level "1" are [sic] entered into all bit positions of the register, respectively. The result of this is that all of the message cells that are delivered by the coupling arrangement ASN are routed to all line assemblies (LIC A0 to LIC A15).

As mentioned above, besides a routing address, the cell headers of the message cells respectively contain what is known as housekeeping information, among other things. Among other things, this housekeeping information indicates the type of the respective message cell; that is, whether the respective message cell is a matter of a normal payload cell, or respectively, a connection-specific control cell, or it is a matter of a system-specific control cell. In this exemplifying embodiment, in order to be able to detect these cell types when a message cell occurs, a cell filter FIL is provided in the control logic arrangement LPS or is connected to the control logic arrangement LPS upstream. This cell filter is passed by the housekeeping information of received message cells, and the detected cell type is indicated. In accordance with the respectively detected cell type, only normal payload cells, or respectively, connection-specific control cells, are routed according to the specifications of the register contents of the control logic arrangement LPS. By contrast, system-specific control cells are forwarded without modification of the respective original connection path as characterized by a particular routing address. This can be accomplished in that, for example, the information (address pointer) that is required for the routing of such a control cell is entered directly into the required queue.

Patent claims

1. Communication device (KE) for transmitting message cells, each of which has routing information at its disposal, having a coupling arrangement (ASN) and having line assemblies (LIC A0...LIC A15) that are allocated thereto, which are respectively connected to at least one transmission line (A0 to A15); whereby, at least in the outgoing direction of transmission, a changeover arrangement (LPS) is provided in the coupling arrangement (ASN) and is connected in series to the line assemblies, characterized in that

the changeover logic arrangement (LPS) has storage means at its disposal, which have a number of register cells corresponding to the number of possible different items routing information, and which can be individually controlled, on the basis of the individual items of routing information, for the purpose of delivering selection information that is respectively stored in the register cells;

that the routing of message cells to the line assemblies is controlled in accordance with the selection information made available by the register cells, instead of the routing information;

and that the selection information stored in the register cells can be individually modified.

Abstract

COMMUNICATION DEVICE FOR TRANSMITTING MESSAGE SIGNALS

Communication device (KE) for transmitting message cells that have routing information at their disposal, having a coupling arrangement (ASN) and line assemblies (LIC A0...LIC A15) that are allocated thereto; whereby a changeover logic arrangement (LPS) is provided in the coupling arrangement (ASN) in the outgoing direction of transmission and is connected in series to the line assemblies.
Under the control of this device, the message cells can be routed to arbitrarily specifiable line assemblies without modification of their routing information.

Figure 1

2/PARTS

09/509062

422 Rec'd PCT/PTO 20 MAR 2000

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IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

APPLICANTS: Jörg Köpp et al. DOCKET NO: P00,0345

SERIAL NO: GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE98/02778

INTERNATIONAL FILING DATE: 18 September 1998

INVENTION: **A COMMUNICATIONS DEVICE FOR TRANSMITTING MESSAGE SIGNALS**

Assistant Commissioner for Patents,
Washington, D.C. 20231

SUBMISSION OF DRAWINGS

Applicants herewith submit two sheets (FIGS. 1-3) of drawings for the above-referenced PCT application.

Respectfully submitted,

(Reg. No. 39,056)

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FIG 1

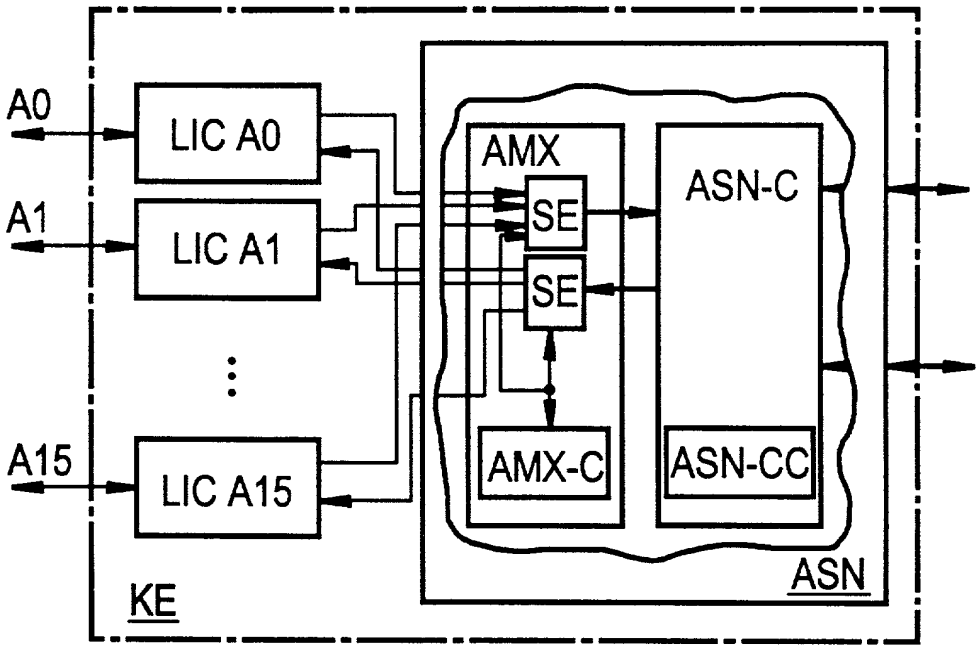

A0
A1
A15
LIC A0
LIC A1
LIC A15
AMX
SE
SE
AMX-C
ASN-C
ASN-CC
ASN
KE

FIG 2

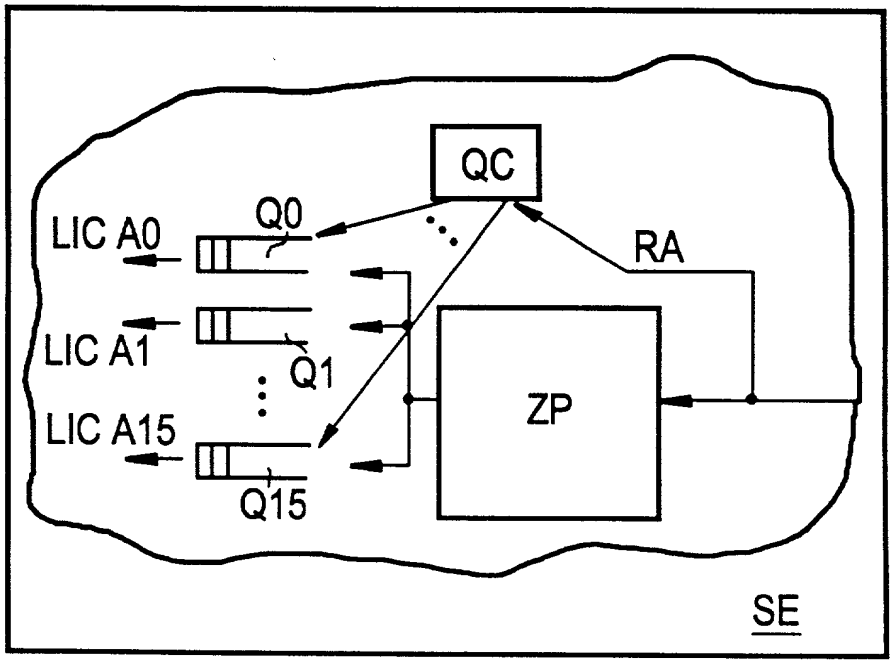
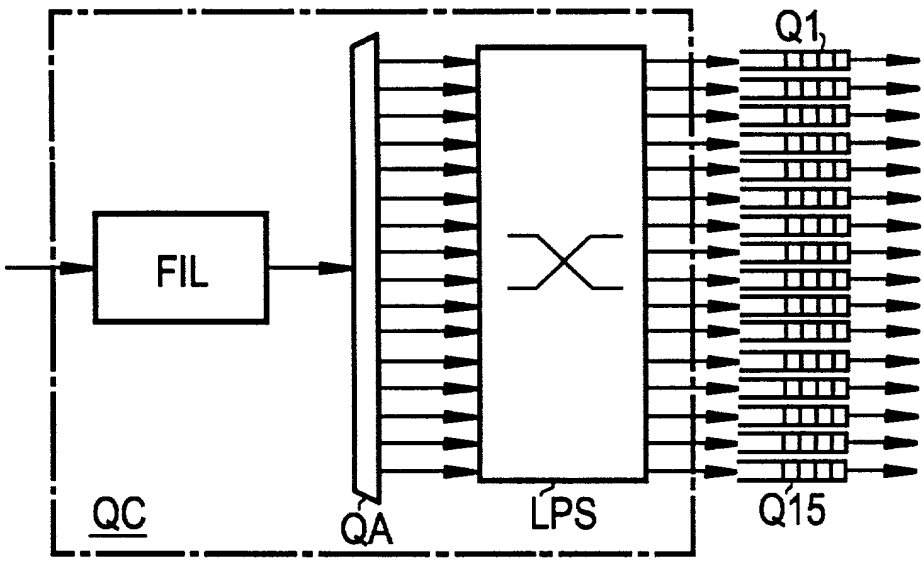

QC
LIC A0
Q0
RA
LIC A1
Q1
LIC A15
Q15
ZP
SE

FIG 3



Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

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_____
_____
_____
_____

the specification of which

(check one)

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PCT Application No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
197 41 431.1	Germany	19. September 1997	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

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(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

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Unterschrift des Erfinders — Datum	Inventor's signature — Date
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Voller Name des sechsten Miterfinders (falls zutreffend):	Full name of sixth joint inventor, if any:
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Postanschrift	Post Office Address

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German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

Messrs John D. Simpson (Registration No 19,842) Lewis T Steadman (17,074), William C Stueber (16,453), P Phillips Connor (19,259), Dennis A Gross (24,410), Marvin Moody (16,549), Steven H. Noll (28,982), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W Guynn (29,927), Edward A Lehmann (22,312), James D. Hobart (24,149), Robert M. Barrett (30,142), James Van Santen (16,584), J. Arthur Gross (13,615), Richard J. Schwarz (13,472) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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